

Claims

- [c1] 1. A method for fabricating a machine stator comprising:
- (a) positioning pre-wound stator windings around respective teeth of a laminated stator yoke; and
 - (b) directly molding composite tooth tips into contact with respective teeth of the laminated stator yoke.
- [c2] 2. The method of claim 1 further comprising, prior to positioning, annealing the laminated stator yoke.
- [c3] 3. The method of claim 1 wherein positioning comprises radially sliding the pre-wound stator windings over the respective teeth.
- [c4] 4. The method of claim 1 wherein the stator teeth include respective key notches.
- [c5] 5. The method of claim 1 further comprising, prior to directly molding, providing insulation around at least portions of the windings.
- [c6] 6. The method of claim 5 wherein the insulation comprises slot liners.
- [c7] 7. The method of claim 1 wherein directly molding comprises injection molding the composite tooth tips.
- [c8] 8. The method of claim 1 wherein positioning comprises compressing the pre-wound stator windings around the respective teeth.
- [c9] 9. The method of claim 8 further comprising, prior to positioning, situating the pre-wound stator windings on a mandrel in a pattern aligned with gaps between the stator teeth.
- [c10] 10. The method of claim 8 wherein compressing is performed prior to directly molding.
- [c11] 11. The method of claim 1 wherein directly molding comprises compression molding the composite tooth tips.
- [c12] 12. The method of claim 11 further comprising, prior to positioning, winding

the stator windings in a winding shape selected to facilitate fabrication a desired tooth tip shape during molding.

- [c13] 13. The method of claim 12 wherein positioning comprises compressing the pre-wound stator windings around the respective teeth, and wherein compressing the pre-wound stator windings and compression molding occur substantially simultaneously.
- [c14] 14. The method of claim 13 further comprising, prior to positioning, situating the pre-wound stator windings on a hollow mandrel in a pattern aligned with gaps between the stator teeth.
- [c15] 15. The method of claim 14 wherein compression molding comprises providing coated magnetic particles between the mandrel and respective teeth and windings and compressing the space between the mandrel and the laminated stator yoke.
- [c16] 16. A machine stator comprising:
(a) stator windings comprising a wound shape designed to provide space for a desired tooth tip shape;
(b) a laminated stator yoke situated around the stator windings; and
(c) molded composite tooth tips between respective windings and in contact with the laminated stator yoke.
- [c17] 17. The stator of claim 16 wherein the laminated stator yoke includes respective key notches.
- [c18] 18. The stator of claim 16 further comprising, insulation around at least portions of the windings.
- [c19] 19. The stator of claim 18 wherein the insulation comprises corrugated material.
- [c20] 20. A method for fabricating a machine stator comprising:
(a) filling end portions of stator windings with non-conducting, non-magnetic particles; and then
(b) compacting the end portions.

- [c21] 21. The method of claim 20 further comprising, after compacting, removing the particles.
- [c22] 22. The method of claim 20 wherein filling the end portions comprises filling the end portions with material comprising the non-conducting non-magnetic particles and a binder.
- [c23] 23. A machine stator comprising compressed end portions of stator windings filled with non-conducting, non-magnetic particles.
- [c24] 24. The stator of claim 23 wherein the compressed end portions further comprise a binder.
- [c25] 25. A method for fabricating a machine stator comprising:
(a) positioning pre-wound stator windings around respective stator teeth; and then
(b) coupling the stator teeth and a stator yoke, wherein the stator yoke radially surrounds the stator teeth.
- [c26] 26. The method of claim 25 further comprising, prior to (a), providing the pre-wound stator windings by winding each stator winding to have a wider winding portion and a narrower winding portion,
wherein the stator teeth comprise tooth tips,
and wherein (a) comprises positioning the narrower winding portion closer to the tooth tips than the wider winding portion.
- [c27] 27. The method of claim 26 wherein providing the pre-wound stator windings further comprises, flat winding the pre-wound stator windings.
- [c28] 28. The method of claim 25 wherein the stator teeth are laminated stator teeth, composite stator teeth, or combinations thereof.
- [c29] 29. The method of claim 28 wherein the stator teeth comprise an integral tooth body.
- [c30] 30. The method of claim 28 wherein the stator teeth comprise discrete teeth and further including providing tooth connectors between the stator teeth.

- [c31] 31. The method of claim 25 wherein the stator yoke is a laminated stator yoke or a composite stator yoke.
- [c32] 32. The method of claim 25 wherein (b) comprises shrink-fitting the stator yoke and the stator teeth.
- [c33] 33. The method of claim 25 wherein the stator teeth comprise material having a radially oriented grain, and wherein the stator yoke comprises material having an azimuthally oriented grain.
- [c34] 34. A machine stator comprising:
(a) stator windings around respective stator teeth; and
(b) a stator yoke radially surrounding and coupled to the stator teeth.
- [c35] 35. The stator of claim 34 wherein each stator winding comprises a wider winding portion and a narrower winding portion with the wider winding portion situated closer to the stator yoke than the narrower winding portion.
- [c36] 36. The stator of claim 35 wherein each stator winding comprises a flat wound stator winding.
- [c37] 37. The stator of claim 33 wherein the stator teeth are laminated stator teeth, composite stator teeth, or combinations thereof.
- [c38] 38. The stator of claim 37 wherein the stator teeth comprise an integral tooth body.
- [c39] 39. The stator of claim 37 wherein the stator teeth comprise discrete teeth and further including tooth connectors between the stator teeth.
- [c40] 40. The stator of claim 33 wherein the stator yoke is or a composite stator yoke.
- [c41] 41. The stator of claim 33 wherein the stator yoke is a laminated stator yoke.
- [c42] 42. The stator of claim 41 wherein the stator yoke comprises a material having an azimuthally oriented grain.
- [c43] 43. The stator of claim 42 wherein the stator teeth comprise material having a radially oriented grain.

[c44]

44. The stator of claim 33 wherein the stator teeth comprise material having a radially oriented grain, and wherein the stator yoke comprises material having an azimuthally oriented grain.

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